Toward a Risk Assessment of Perfluoroalkyl Acids

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Keywords: perfluorinated, PFOA, PFOS, risk, assessment

Perfluoroalkyl acids (PFAA), such as perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS), and fluorotelomer alcohols are surfactants that have wide applications in industrial and consumer products. Various fluorotelomer alcohols are known to be metabolized to perfluorocarboxylic acids. These man-made chemicals are stable and persistent in the environment, but have previously been viewed as biologically inactive. However, recent bio-monitoring studies have indicated a widespread presence of PFOS, PFOA, and other PFAA in humans and wildlife, and preliminary studies have indicated several toxic effects of these chemicals in laboratory animals. Together, these findings have drawn considerable interest from the public, and their potential relevance to human health risks and ecological impacts has rendered this class of chemicals an emerging concern for the program offices at the U.S. Environmental Protection Agency (U.S. EPA) as well as their counterparts in Canada and Europe. In response to a call for assistance from OPPTS, our laboratories (NHEERL and NERL) at ORD have launched investigations of the adverse health effects of PFOS and PFOA and have developed analytical methods to aid the exposure assessment of these chemicals. In addition to collaborations across laboratories within ORD and OPPTS, formal and informal partnerships have been established with other federal agencies (Centers for Disease Control and Prevention, National Toxicology Program), manufacturing industries (3M, DuPont), and academic investigators to characterize the toxicity profiles of PFAA in animal models and provide models for the extrapolation of animal findings to human exposure. Indeed, these joint efforts have been instrumental in providing a health risk assessment of these chemicals (e.g., recent PFOA assessment). Results from ongoing and planned collaborative research among these partners will undoubtedly lend insights to the modes and mechanisms of action for this unique class of chemicals, thereby supporting risk assessment decisions that are based on sound scientific findings and promoting the designs of safe replacement products.